

NAME	PAYOFF DIAGRAM	PAYOFF EQUATION
DISCRETE		$P = \begin{cases} N & \text{IF } x_1 \text{ occurs} \\ 0 & \text{ELSE} \end{cases}$
DIGITAL CALL		$P = \begin{cases} 0 & \text{IF } x < a \\ N/2 & \text{IF } x = a \\ N & \text{IF } x > a \end{cases}$
DIGITAL PUT		$P = \begin{cases} N & \text{IF } x < a \\ N/2 & \text{IF } x = a \\ 0 & \text{IF } x > a \end{cases}$
DIGITAL RANGE		$P = \begin{cases} N & \text{IF } a < x < b \\ N/2 & \text{IF } x = a \text{ or } x = b \\ 0 & \text{ELSE} \end{cases}$
CALL SPREAD		$P = \begin{cases} 0 & \text{IF } x < a \\ N \frac{(x-a)}{(b-a)} & \text{IF } a < x < b \\ N & \text{IF } x > b \end{cases}$
PUT SPREAD		$P = \begin{cases} N & \text{IF } x < a \\ N \frac{(b-x)}{(b-a)} & \text{IF } a < x < b \\ 0 & \text{IF } x > b \end{cases}$

FIG. 1 (PROWART)

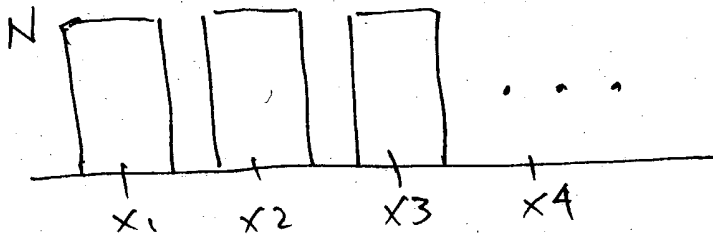


FIG. 2A

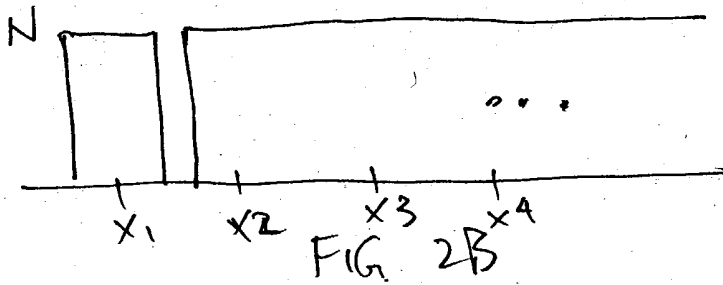


FIG. 2B

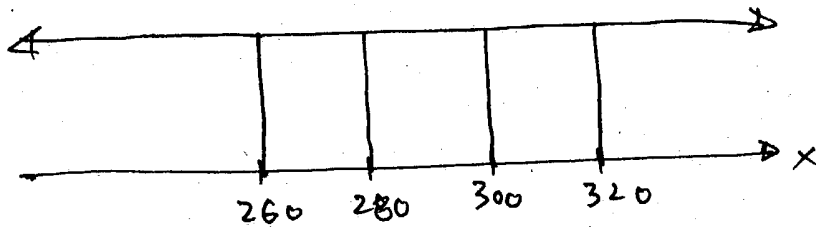


FIG. 2C

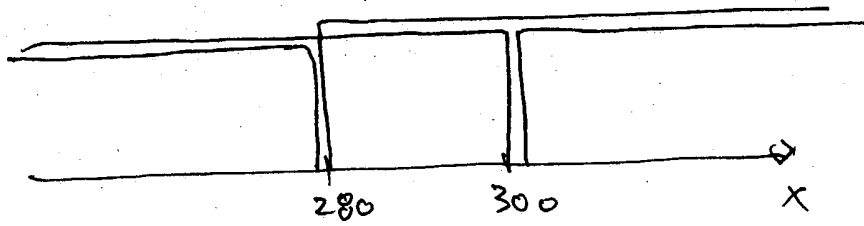


FIG. 2D

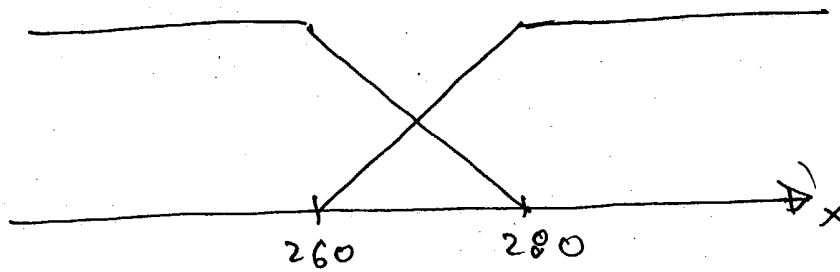


FIG. 2E

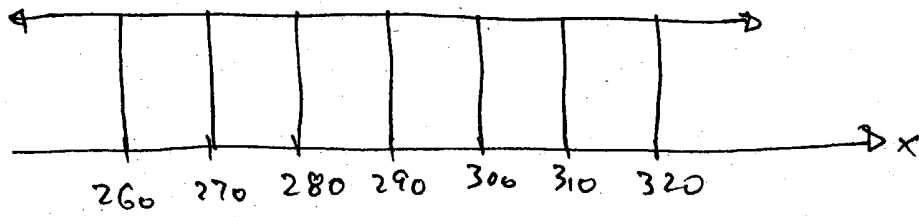


FIG. 3

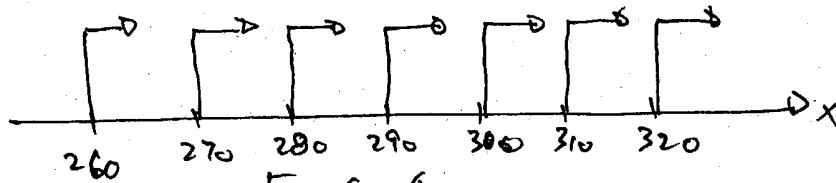
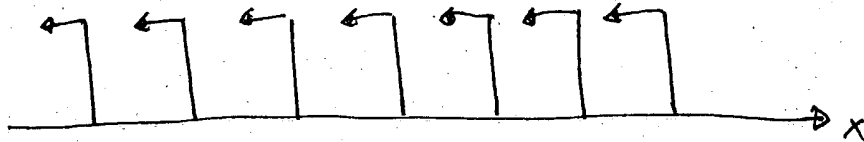


FIG. 4

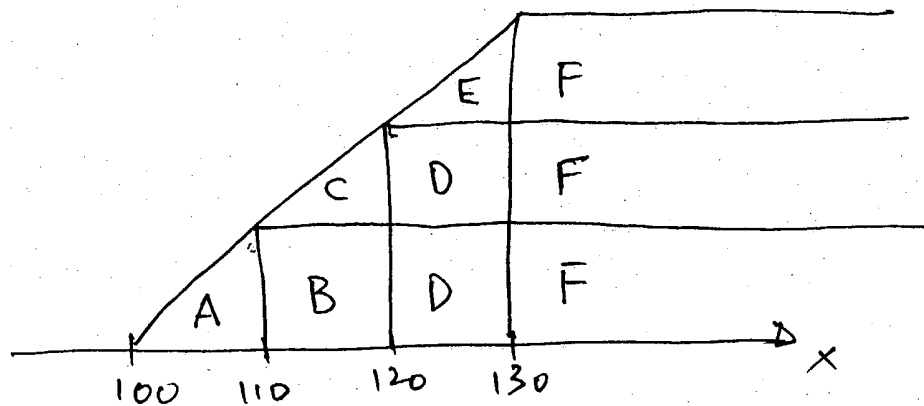


FIG. 5A

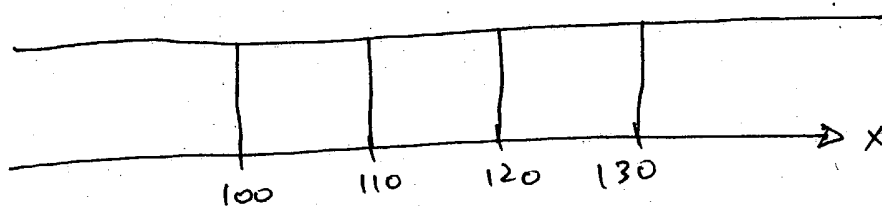
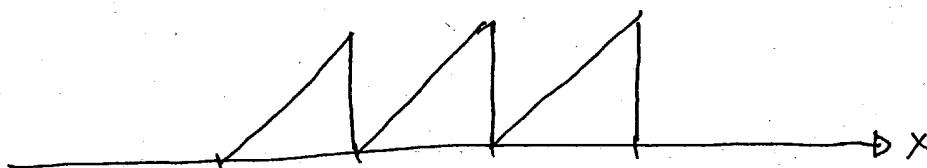
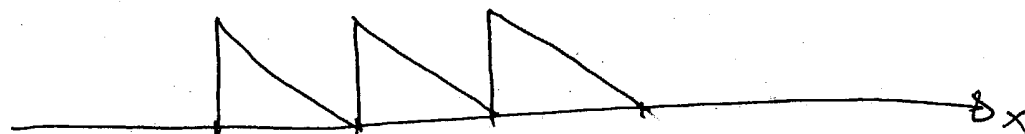


FIG. 5B

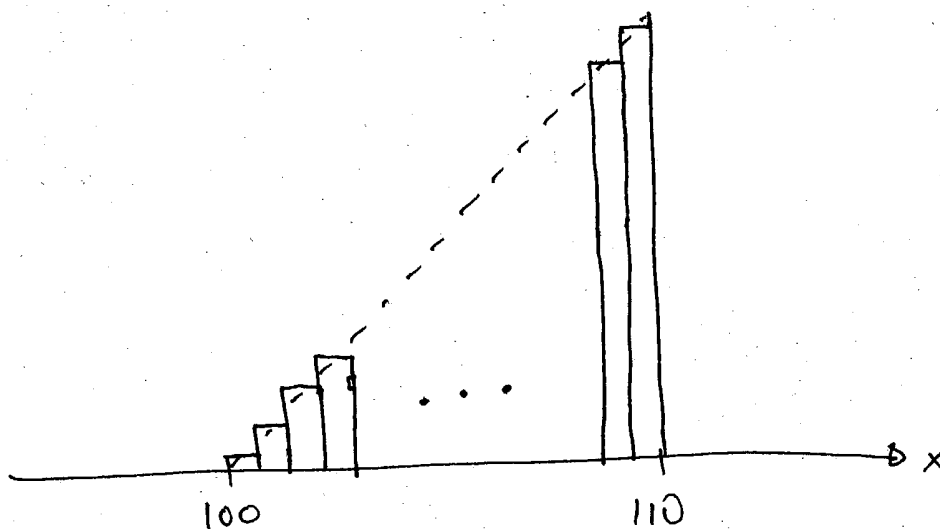
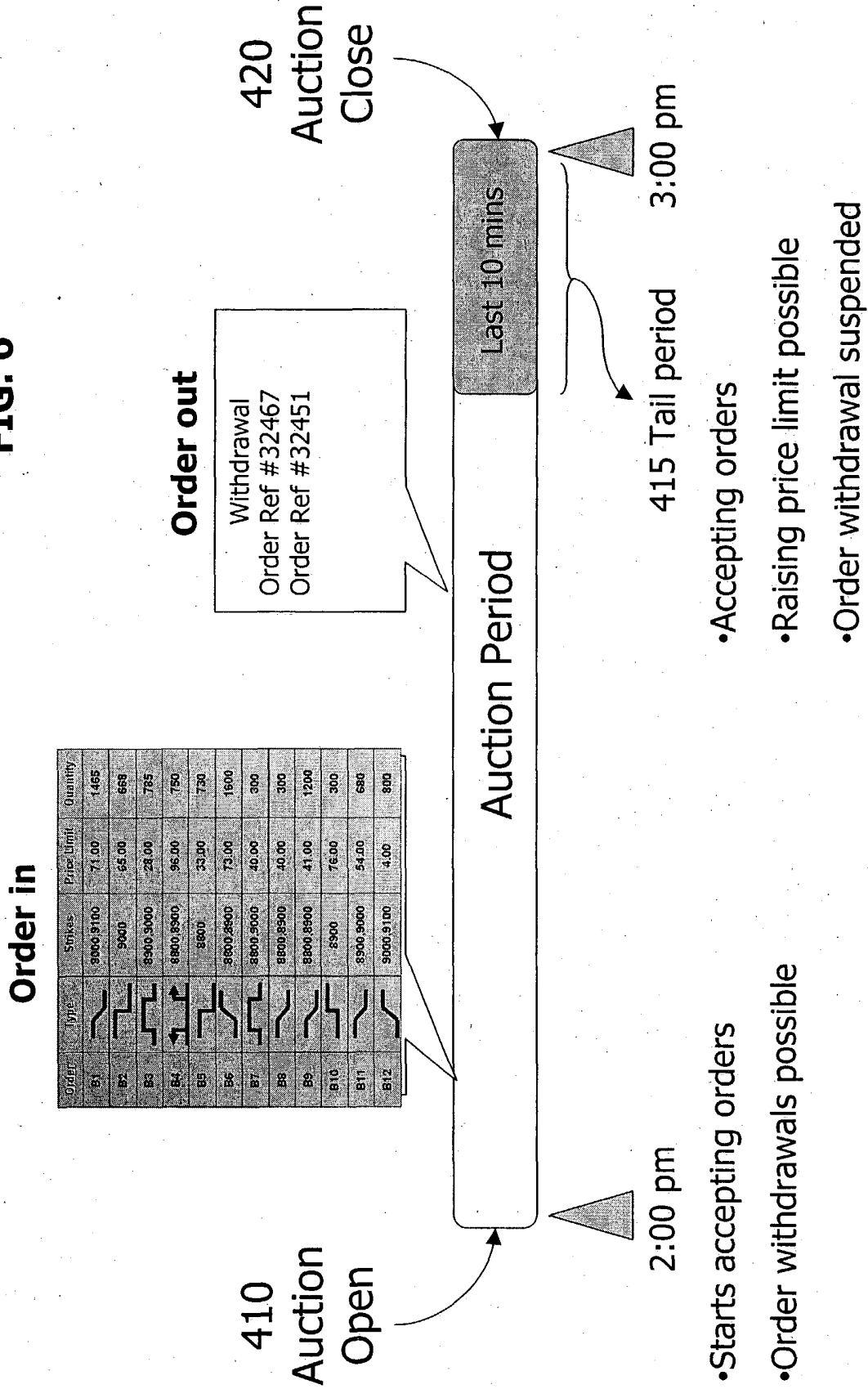
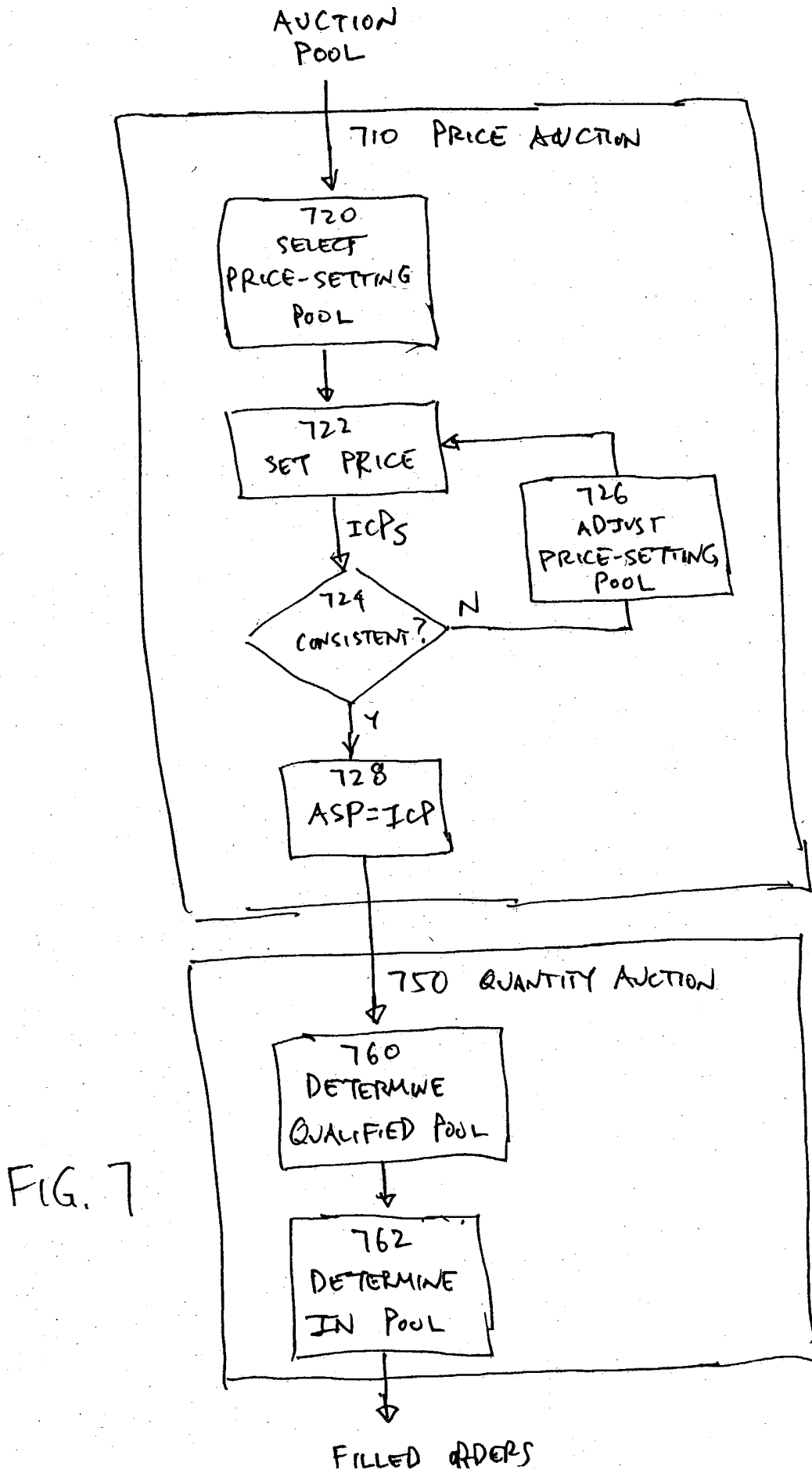


FIG. 5C

**FIG. 6**





	x1	x2	x3	x4
Total IA	\$1000	\$2000	\$3000	\$4000
% (pct)	10%	20%	30%	40%
MRPR	10.00	5.00	3.33	2.50
Price	\$10	\$20	\$30	\$40

FIG. 8



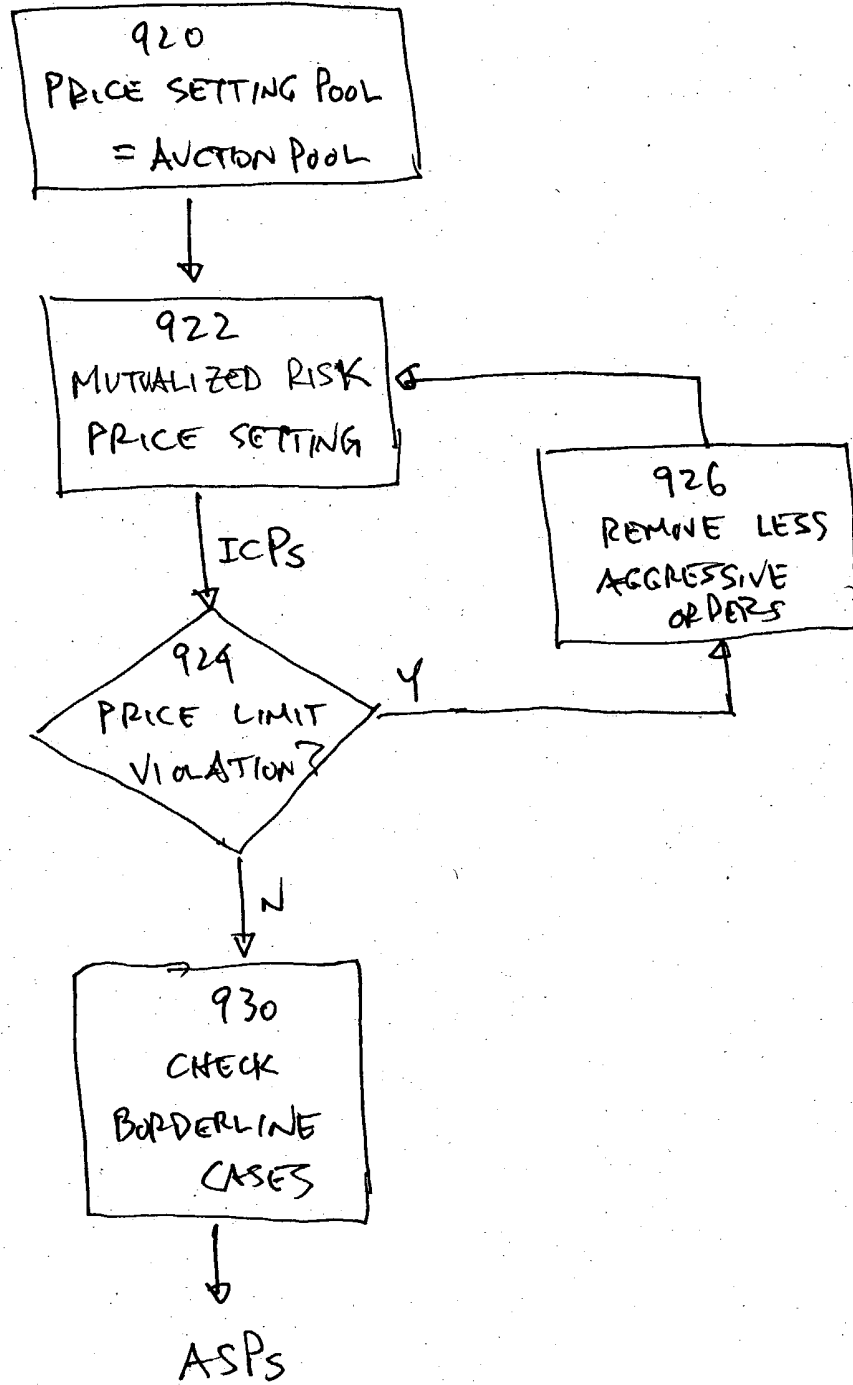


FIG. 9A

	x1		x2	
	Order	MRPR	Order	MRPR
most aggressive	12	5.28		
	154	5.30	47	2.70
	37	5.30	83	2.99
	98	5.40	7	3.20
			119	3.21
least aggressive				

FIG. 9B

### AUCTION POOL

	x1	x2	x3	x4	short x1
Total IA	\$3000	\$2000	\$3000	\$4000	\$2000

### PRICE-SETTING POOL

	x1	x2	x3	x4
Total Long IA	\$3000	\$2000	\$3000	\$4000
Total Short IA	\$2000			
Net Long IA	\$1000	\$2000	\$3000	\$4000
% (pct)	10%	20%	30%	40%
MRPR	10.00	5.00	3.33	2.50
Price	\$10	\$20	\$30	\$40

FIG. 10A

### AUCTION POOL

	x1	x2	x3	x4
Long	\$400,000	\$200,000	\$100,000	\$300,000
Short	\$50,000	\$30,000	\$10,000	\$70,000

### PRICE-SETTING POOL

	x1	x2	x3	x4
Long IA	\$400,000	\$200,000	\$100,000	\$300,000
% (pct)	40%	20%	10%	30%
MRPR	2.50	5.00	10.00	3.33
Price	\$40	\$20	\$10	\$30

### QUANTITY AUCTION FOR SHORTS

Filled Short	\$40,000	\$20,000	\$10,000	\$30,000
Unfilled Short	\$10,000	\$10,000	\$0	\$40,000

FIG. 10B

### AUCTION POOL

	x1	x2	x3	x4	short x1
Total IA	\$400	\$300	\$200	\$100	\$100

### PRICE-SETTING POOL

	x1	x2	x3	x4
Total Long IA	\$400	\$300	\$200	\$100
Total Short IA	\$100			
Net Long IA	\$300	\$300	\$200	\$100
Converted Short IA		\$100	\$67	\$33
Total Pool IA	\$400	\$400	\$267	\$133
% (pct)	33%	33%	22%	11%
MRPR	3.00	3.00	4.50	9.00
Price	\$33.33	\$33.33	\$22.22	\$11.11

FIG. 10C

## CONVERSION OF SHORTS TO LONGS

Short		x1	x2	x3	x4
\$40,000 x1	→		\$20,000	\$10,000	\$30,000
\$20,000 x2	→	\$40,000		\$10,000	\$30,000
\$10,000 x3	→	\$40,000	\$20,000		\$30,000
\$30,000 x4	→	\$40,000	\$20,000	\$10,000	
Total		\$120,000	\$60,000	\$30,000	\$90,000

## TOTAL LONG POSITIONS

	x1	x2	x3	x4
Original Long	\$400,000	\$200,000	\$100,000	\$300,000
Converted Short	\$120,000	\$60,000	\$30,000	\$90,000
Total	\$520,000	\$260,000	\$130,000	\$390,000

FIG. 11

## AUCTION POOL

Order	x1	x2	x3	x4	Price Limit
1 (IA)	\$2000				\$17
2 (IA)	\$3000				\$30
3 (IA)		\$5000			\$30
4 (IA)			\$5000		\$30
5 (IA)				\$4000	\$40
6 (CQ)				40 units	\$50

## PRICE-SETTING POOL, ITERATION 1

	x1	x2	x3	x4
IA	\$5000	\$5000	\$5000	\$4000
DIA				\$2000
Total IA	\$5000	\$5000	\$5000	\$6000
% (pct)	23.81%	23.81%	23.81%	28.57%
Price	\$23.81	\$23.81	\$23.81	\$28.57

## PRICE-SETTING POOL, ITERATION 2

	x1	x2	x3	x4
IA	\$5000	\$5000	\$5000	\$4000
DIA				\$1600
Total IA	\$5000	\$5000	\$5000	\$5600
% (pct)	24.27%	24.27%	24.27%	27.18%
Price	\$24.27	\$24.27	\$24.27	\$27.18

FIG. 12

## AUCTION POOL

Order	IA	Combination	Allocation Policy
1	\$10,000	x1 and x2	1:1:1:1
2	\$10,000	x2 and x3	1:3:1:1
3	\$10,000	x3 and x4	1:1:2:1
4	\$10,000	x1 and x4	2:3:2:3

## PRICE-SETTING POOL

Order	x1	x2	x3	x4
1	\$5000	\$5000		
2		\$7500	\$2500	
3			\$6666.67	\$3333.33
4	\$4000			\$6000
Total IA	\$9000	\$12500	\$9166.67	\$9333.33
% (pct)	22.50%	31.25%	22.92%	23.33%
Price	\$22.50	\$31.25	\$22.92	\$23.33

FIG. 13



## AUCTION POOL

Order	IA	Combination	Allocation Policy
1	\$7000	x1 and x2	exact
2	\$9000	x2 and x3	exact
3	\$5000	x3 and x4	exact
4	\$6000	x1 and x4	exact

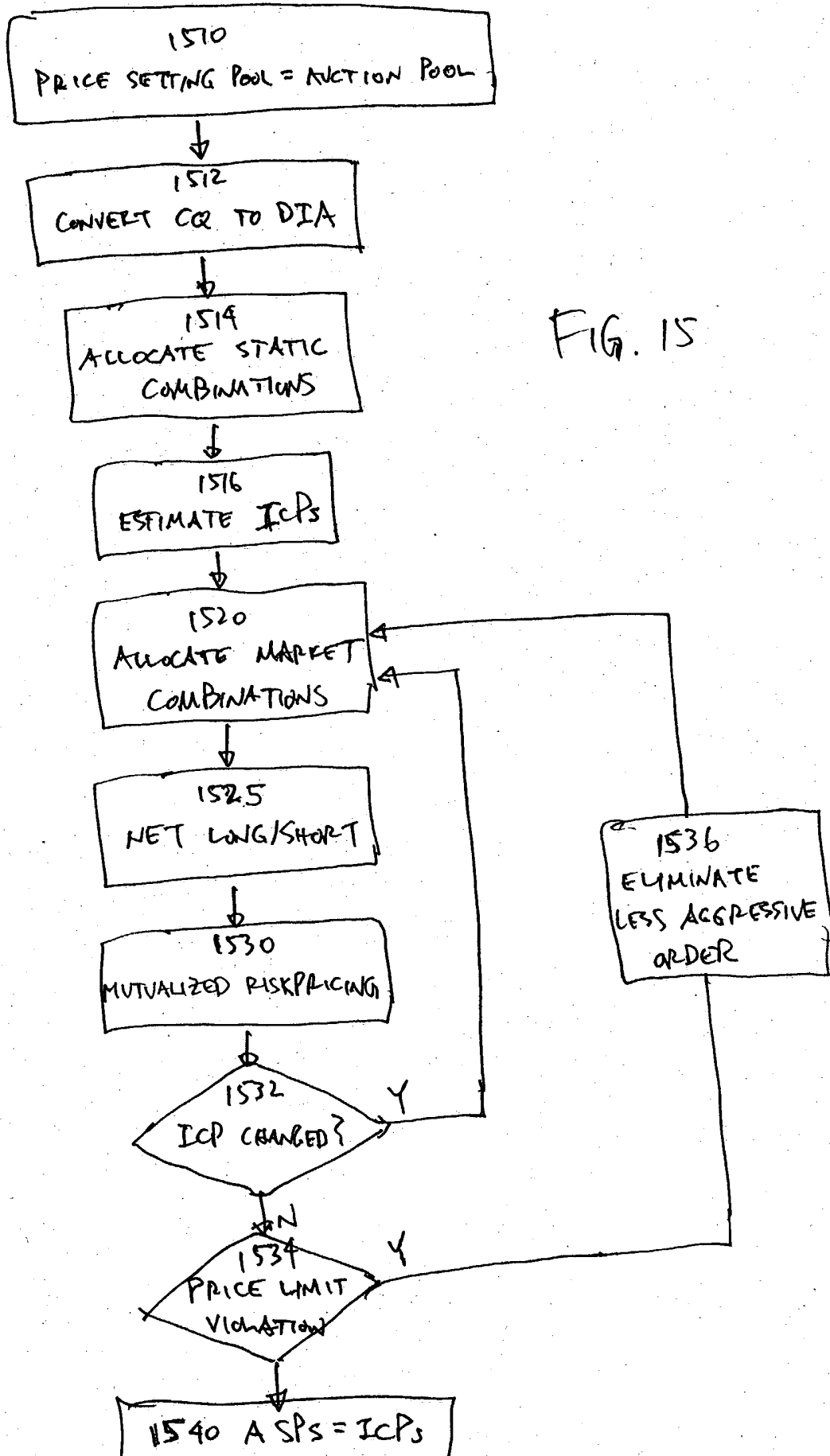
## PRICE-SETTING POOL, ITERATION 1

Order	x1	x2	x3	x4
1	\$3500	\$3500		
2		\$4500	\$4500	
3			\$2500	\$2500
4	\$3000			\$3000
Total IA	\$6500	\$8000	\$7000	\$5500
% (pct)	24.07%	29.63%	25.93%	20.37%

## PRICE-SETTING POOL, FINAL ITERATION

Order	x1	x2	x3	x4
1	\$3000	\$4000		
2		\$4000	\$5000	
3			\$5000	\$3000
4	\$3000			\$3000
Total IA	\$6000	\$8000	\$10000	\$6000
% (pct)	20.00%	26.67%	33.33%	20.00%

FIG. 14



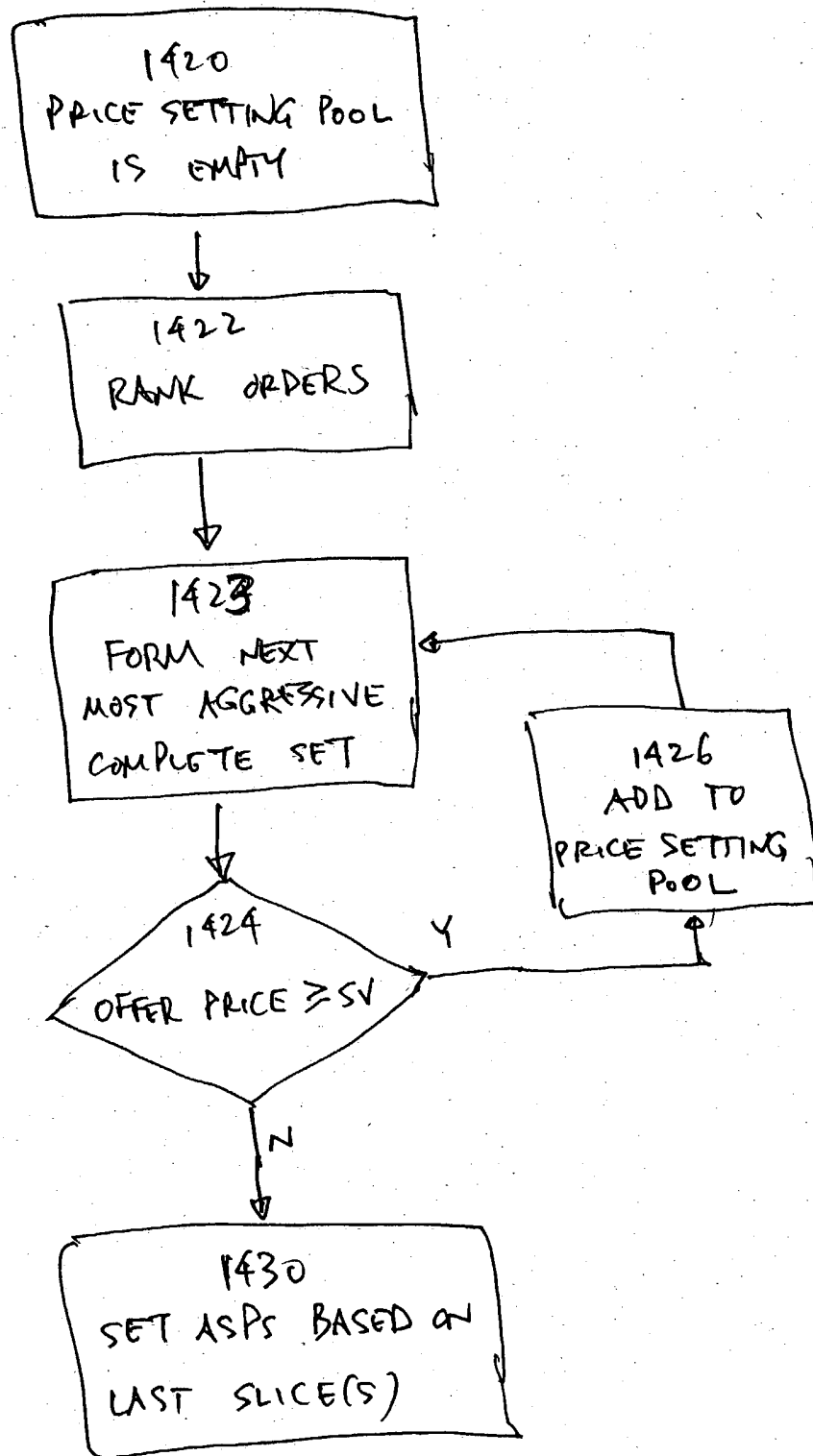


FIG. 16A

### PRICE-SETTING POOL

Slice	x1	x2	x3	x4	Offer Price
1	\$30	\$35	\$41	\$7	\$113
2	\$28	\$33	\$38	\$6	\$105
3	\$28	\$33	\$37	\$6	\$104
4	\$28	\$33	\$36	\$5	\$102
5, last slice	\$28	\$32	\$36	\$5	\$101
rejected	\$27	\$32	\$35	\$3	\$97
Price	\$27.72	\$31.68	\$35.64	\$4.95	

FIG. 16B

**DRAW POOL**

x1	x2	x3	x4	not x1	not x2	not x3	not x4
\$30	\$35	\$41	\$7	\$78	\$72	\$67	\$95
\$28	\$33	\$38	\$6	\$73	\$70	\$64	\$94
\$28	\$33	\$37	\$6	\$73	\$70	\$63	\$93
\$28	\$33	\$36	\$5	\$73	\$69	\$63	\$93
\$28	\$32	\$36	\$4	\$73	\$68	\$61	\$93

**BEST OFFERS FOR SLICE 1**

buy all	sell all	trade x1	trade x2	trade x3	trade x4
\$113	\$112	\$108	\$107	\$108	\$102

**FIG. 17A**

### PRICE-SETTING POOL, SLICE 1

Slice	x1	x2	x3	x4	not x1	not x2	not x3	not x4
1	\$30	\$35	\$41	\$7				

### DRAW POOL, AFTER SLICE 1

x1	x2	x3	x4	not x1	not x2	not x3	not x4
<del>\$30</del>	<del>\$35</del>	<del>\$41</del>	<del>\$7</del>	\$78	\$72	\$67	\$95
\$28	\$33	\$38	\$6	\$73	\$70	\$64	\$94
\$28	\$33	\$37	\$6	\$73	\$70	\$63	\$93
\$28	\$33	\$36	\$5	\$73	\$69	\$63	\$93
\$28	\$32	\$36	\$4	\$73	\$68	\$61	\$93

FIG. 17B

### PRICE-SETTING POOL, FINAL

Slice	x1	x2	x3	x4	not x1	not x2	not x3	not x4
1	\$30	35	\$41	\$7				
2					\$78	\$72	\$67	\$95
3	\$28	\$33	\$38	\$6				
4	\$28	\$33	\$37	\$6				
5		\$33				\$70		
6		\$32				\$70		
7	\$28				\$73			
8, last	\$28				\$73			

FIG. 17C

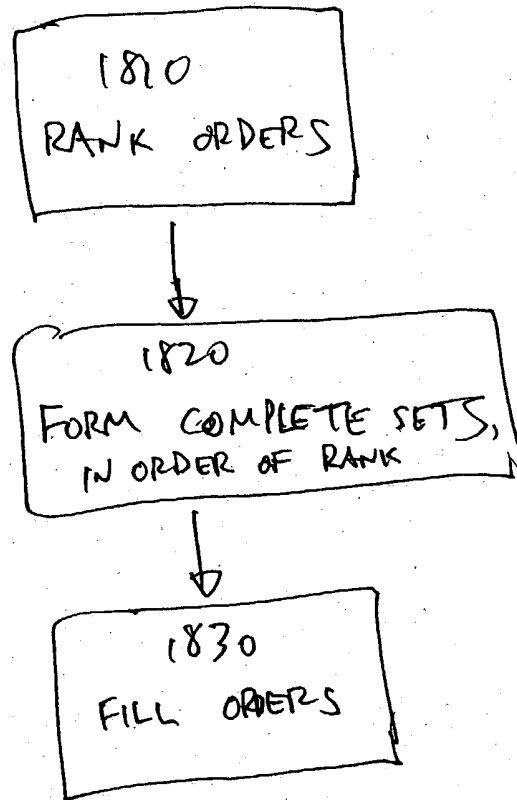


FIG. 18



## RANKING OF QUALIFIED POOL

Order	x1	x2	x3	x4	x5
1 (most aggressive)	2	2	2		
2			2	2	2
3				2	2
4	2	2			
5	2	2	2		
6			2	2	2
7			2	2	

## ACCUMULATION OF ORDERS

Slice	x1	x2	x3	x4	x5
1	order 1	order 1	order 1	order 2	order 2
2	order 1	order 1	order 1	order 2	order 2
3	order 4	order 4	order 2	order 3	order 3
4	order 4	order 4	order 2	order 3	order 3
5	order 5	order 5	order 5	order 6	order 6
6	order 5	order 5	order 5	order 6	order 6
7			order 6	order 7	
8			order 6	order 7	
9			order 7		
10			order 7		

FIG. 19A

## ACCUMULATION OF ORDERS

Slice	x1	x2	x3	x4	x5
1	order 1	order 1	order 1	order 3	order 3
2	order 1	order 1	order 1	order 3	order 3
3	order 4	order 4	order 2	order 2	order 2
4	order 4	order 4	order 2	order 2	order 2
5	order 5	order 5	order 5	order 6	order 6
6	order 5	order 5	order 5	order 6	order 6
7			order 6	order 7	
8			order 6	order 7	
9			order 7		
10			order 7		

FIG. 19B

## ACCUMULATION OF ORDERS

Slice	x1	x2	x3	x4	x5
1	order 1	order 1	order 1	order 3	order 3
2	order 1	order 1	order 1	order 3	order 3
3	order 4	order 4	order 2	order 2	order 2
4	order 4	order 4	order 2	order 2	order 2
5	order 5	order 5	order 5	order 6	order 6
6	order 5	order 5	order 5	order 6	order 6
7	X	X	order 6	order 7	X
8	X	X	order 6	order 7	X
9	X	X	order 7	X	X
10	X	X	order 7	X	X

## ACCUMULATION OF ORDERS, ORDER 7 REDUCED

Slice	x1	x2	x3	x4	x5
1	order 1	order 1	order 1	order 3	order 3
2	order 1	order 1	order 1	order 3	order 3
3	order 4	order 4	order 2	order 2	order 2
4	order 4	order 4	order 2	order 2	order 2
5	order 5	order 5	order 5	order 6	order 6
6	order 5	order 5	order 5	order 6	order 6
7	X	X	order 6	order 7	X
8	X	X	order 6	X	X
9	X	X	order 7	X	X

FIG. 20

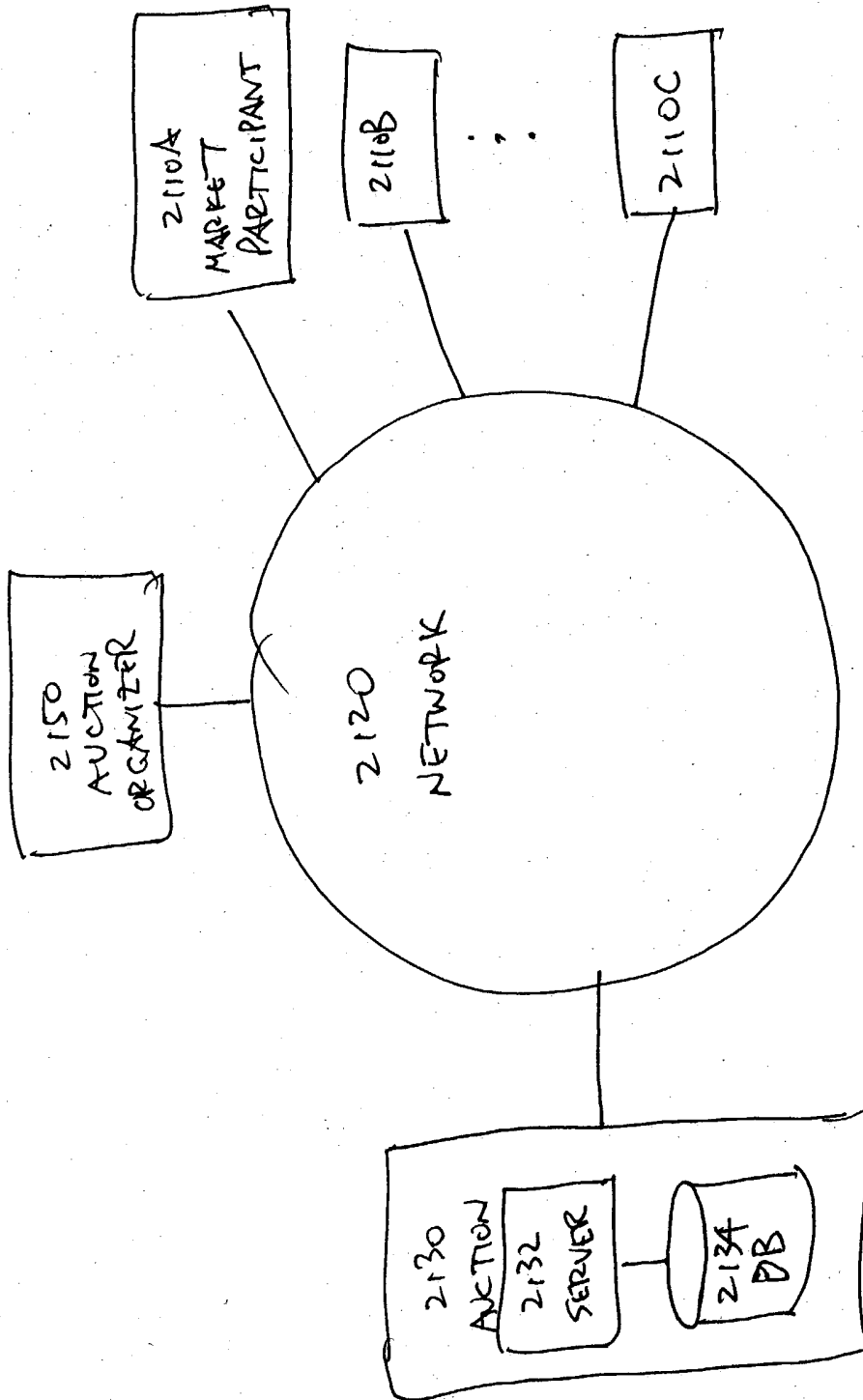


FIG. 21